A Study of Speed Limit Increases, Traffic Fatalities, and Fatal Crashes in Iowa and Surrounding Midwestern States

(This report has been updated and expanded using the latest available data.)

May 2006

Midwest Fatality Experience on All Roads

As of Jan. 1, 2005, five Midwestern states had raised their speed limits above 65 mph, this included Kansas, Minnesota, Missouri, Nebraska, and South Dakota. Three states---Illinois, Iowa and Wisconsin---had not increased their speed limits. In some states, speed limits were raised on the expressways and rural, two-lane roadways, in addition to the interstate routes.

The total statewide fatality data in this study reaffirms a "spillover" effect, as indicated in other studies, where fatalities increase on the entire roadway system when speed limits are raised on parts of the rural roadway systems.[1]

This is the tenth in a series of annual studies of traffic fatalities in Midwestern states following the increase in speed limits in many of these states. The original study was published as part of the annual "Update Report on Speed Limits in Iowa."[2]

Since all five states who raised their speed limits above 65 mph now have eight years of fatality data following the speed limit increase, a study was conducted using the eight years preceding the speed limit change (1988 through 1995) and eight years following (1997 through 2004).

Data from Iowa, Illinois and Wisconsin, which did not increase their speed limits above 65 mph, were also included in this study, using the same years for comparison purposes. Data for 1996 was not used because it was a transition year for four of the higher speed limit states. Minnesota changed its speed limit in early 1997. It is still used in this study as one of the states that raised its speed limits since the same comparison years could be used for Minnesota.

Table 1 includes the four surrounding states that increased their speed limits and Iowa's demographic sister state, Kansas, which also raised its speed limit. This table displays average annual fatalities for the before and after periods, the difference between the before and after average, and percent difference in the states that raised their speed limits. These fatality numbers were used to calculate the percentage rate of increase or decrease in traffic fatalities for the states in the study.

For the states that raised their speed limits, each experienced an increase in the average yearly fatalities. All five states with speed limits higher than 65 mph showed an increase in traffic deaths that ranged from 7 percent to 13 percent. This study has been conducted for eight years. In each of these years, the average annual fatalities have been higher since the speed limits were increased.

[1] Richter ED, Barach P, Freedman L, Krikler S, Iraeli A, Raised Speed Limits, Speed Spill Over, Case-Fatality Rates and Road Deaths in Israel: A 5-Year Follow-up, American Journal of Public Health, April 2004, pp 568-574

[2] Safety Management System Taskforce on Speed Limits, Update Report(s) on Speed Limits in Iowa, 1998-2002

Table 1
States That Increased Their Speed Limits Above 65 mph
Before: 1988-1995; After: 1997-2004

	8-Year Average, Before Change	8-Year Average, After Change	Total Change in Fatalities (Number)	Average Difference (Number)	Percent Difference
Kansas	433	488	441	55	+ 11%
Minnesota	576	618	337	42	+ 7%
Missouri	1049	1160	887	111	+ 10%
Nebraska	266	286	162	20	+ 7%
South Dakota	151	173	179	22	+ 13%
Total Average Percentage Difference					+ 9%

Table 2 shows the eight-year average percentage for fatalities in Iowa and Illinois (states that did not increase their speed limits over 65 mph) decreased by 11 percent each. Wisconsin, which did not raise its speed limits over 65 mph, was the only state in that group to show an increase in traffic deaths. However, its percent increase was less than half of the lowest percent of increase in the states that raised their speed limit over 65 mph.

Table 2
States That Did Not Increase Their Speed Limits Above 65 MPH
Before: 1988-1995; After: 1997-2004

	8-Year Average, Before Change	8-Year Average, After Change	Total Change in Fatalities (Number)	Average Difference (Number)	Percent Difference
Illinois	1567	1414	-1229	-154	-11%
Iowa	491	442	-390	-49	-11%
Wisconsin	752	774	176	22	3%
Total Average Percentage Difference					-7%

An analysis of fatalities from 1988 to 1995 and 1997 to 2004 revealed the collective fatality experience for all of the Midwestern states that did not raise their speed limits above 65 mph represented a 7 percent decline in traffic deaths. States that did raise their speed limits above 65 mph experienced a 10 percent increase in traffic fatalities. This multi-year data is consistent with data published in previous multi-year and single-year reports since 1997.

Kansas-Iowa Fatality Comparisons, Before and After the Kansas Speed Limit Increase
Iowa and Kansas have very similar demographics with respect to population number, miles of roadway, vehicle miles of travel (VMT), and number of licensed drivers.

Table 3 below shows the demographic comparisons for population, licensed drivers, VMT estimates, and fatality rates for 1989, when both states had a 65 mph maximum speed limit.

Table 3
1989

1989	Population	Licensed Drivers	VMT	Fatality Rate
Kansas	2,478,000	1,715,000	21,913	1.95
Iowa	2,777,000	1,872,000	22,509	2.29

Table 4 shows the same information for 2002, the seventh year of the 70 mph maximum speed limit in Kansas.

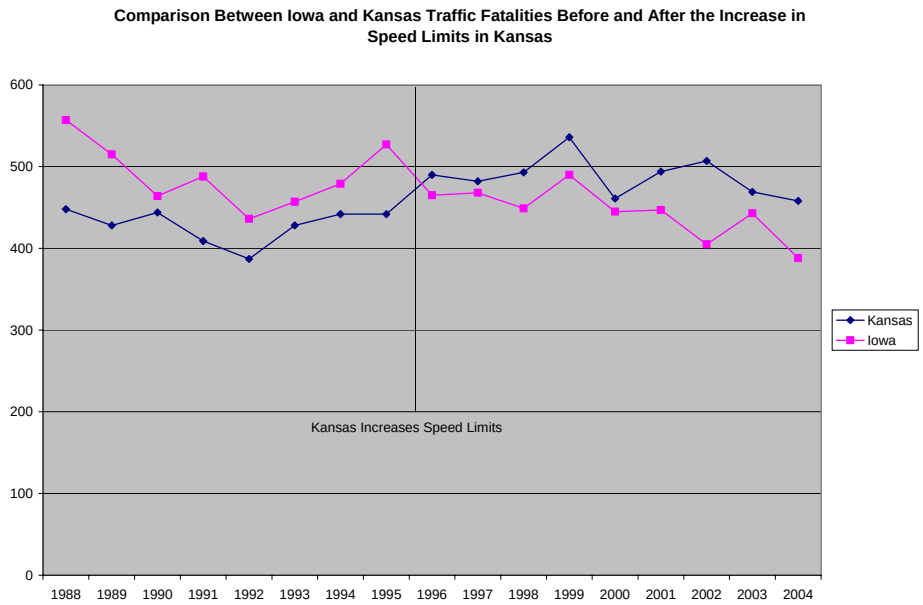
Table 4
2002

2002	Population	Licensed Drivers	VMT	Fatality Rate
Kansas	2,695,000	1,935,000	28,229	1.75
Iowa	2,923,000	1,933,000	30,461	1.48

During the period prior to the speed limit change in Kansas, Iowa had a higher number of traffic fatalities each year in comparison to Kansas, with an eight-year average of 491 fatalities, compared to 442 fatalities in Kansas. After Kansas changed its speed limit on the Interstate Highway System, it had a higher number of fatalities each year. During the eight years following the change, (see tables 1-2), Kansas averaged 488 fatalities, while Iowa averaged 442 fatalities.

Chart 1 shows a year by year comparison. For the sake of continuity, 1996 data was included in this chart.

Chart 1



Minnesota-Iowa Fatality Comparisons, Before and After the Minnesota Speed Limit Increase
The Iowa legislature passed a speed limit increase to 70 mph from 65 mph on rural interstate highways in 2005. With the previous increase in expressway speed limits on rural expressways to 65 mph from 55 mph earlier, Iowa's speed limit laws are now similar to Minnesota.

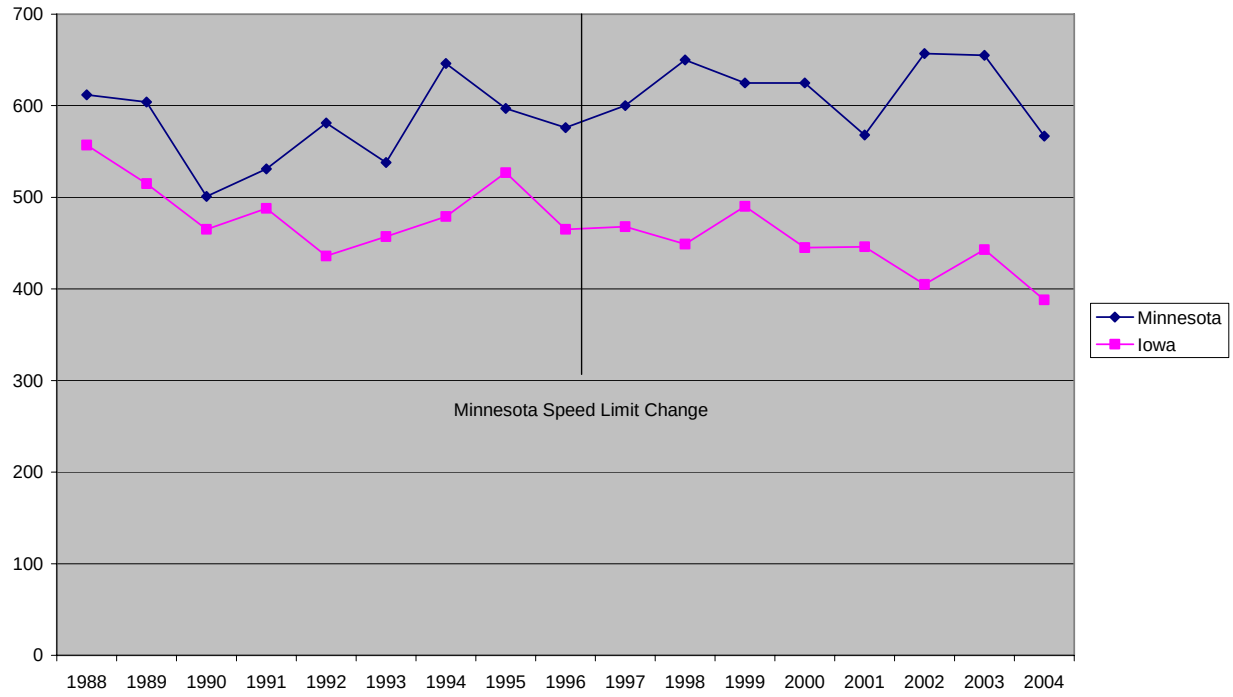
As part of the study of Midwestern states, a two-state comparison was made between traffic fatalities in Iowa and Minnesota. This comparison provided legislators and the public with information about how the change in Minnesota's speed limits affected traffic fatalities, in comparison to Iowa, which had not raised Interstate speed limits at the time.

This study looked at eight years of data prior to Minnesota's speed limit increase and eight years following. In the eight years following Minnesota's speed limit increase (1988-1995), Minnesota experienced 337 more traffic fatalities than the eight years studied before the change (1997-2004). Over the same periods, Iowa experienced 390 fewer fatalities.

The following Chart 2 shows the growing divide between fatality numbers in Minnesota and Iowa. For the sake of continuity, the 1996 fatalities for both states are included in the chart.

Chart 2

A Comparison of Iowa and Minnesota Traffic Fatalities Before and After Minnesota Increased Speed Limits



Iowa Interstate Crash History

A historical perspective of previous speed limit changes in Iowa can also give an indication of how future speed limit changes might affect traffic fatalities. Shown in Tables 11a and 11b are annual traffic fatalities and fatal crash rates on Iowa's rural Interstate system from 1970 through 2005.

From 1970 to 1974 the speed limit on Iowa rural Interstates was 75 mph. In 1974, in the midst of the first national oil crisis, a national maximum speed limit (NMSL) was set at 55 mph. In 1987, the NMSL was increased to 65 mph. In 1995, the NMSL was repealed. In 2005, Iowa increased its rural interstate speed limit to 70 mph.

In addition to the number of fatal crashes and fatalities for each year, the tables include four-year averages for the period immediately before and after each speed limit change. In every instance, fatalities were higher each time the speed limit was increased, lower following the decrease from 75 mph to 55 mph, and lower during the period of the 55 mph speed limit.

The four-year average for the last four years at 75 mph was 35 fatal crashes and 43 fatalities. The first four years at 55 mph averaged 12 fewer fatal crashes and 15 fewer fatalities. In the last four years at the 55 mph speed limit, there were 21 fewer fatal crashes and 26 fewer fatalities than during the last three years at 75 mph. That was an almost 61 percent decrease in annual average fatalities.

Table 5
Fatalities and Fatal Crashes on Iowa's Rural Interstate System
Speed Limit Change from 75 mph to 55 mph

	Four-Year Averages			
Time Period	Fatal Crashes	Percent Change	Fatalities	Percent Change
Last Four Years of 75 mph	35		43	
First Four Years of 55 mph	23	-34.3%	28	-34.9%
Last Four Years of 55 mph	14	-60.0%	17	-60.5%

One of the ways to measure exposure is by calculating fatality rates and fatal crash rates according to estimated vehicle miles of travel (VMT). The estimated VMT for each four-year period were averaged from the official annual estimates for that period.

Rates calculated using estimated VMT in long-term studies can fall prey to VMT inflation, where the near-steady increase in annual VMT creates an appearance of decline in fatality and fatal crash rates even though there has been no real reduction. In this case, however, the fatality and fatal crash rates per 100 million miles of travel closely resemble the percentage decrease in fatal crashes and fatality numbers. (See Table 6.)

Table 6
Fatality Rates and Fatal Crash Rates per 100 Million Vehicle Miles of Travel
on Iowa's Rural Interstate System
Speed Limit Change from 75 mph to 55 mph

	Four-Year Averages			
Time Period	Fatal Crash Rate	Percent Change	Fatality Rate	Percent Change
Last Four Years of 75 mph	1.76		2.18	
First Four Years of 55 mph	1.10	-37.5%	1.35	-38.1%
Last Four Years of 55 mph	0.54	-69.3%	0.66	-69.7%

Another way to calculate fatality and fatal crash rates is to use the number of licensed drivers in the jurisdiction. (See Table 7.) The number of licensed drivers is taken each year from the Iowa driver's license file. These numbers are more stable for use in long-term studies and appear to track more closely to the rise and fall of actual deaths and crashes.

For this study, rates were figured using the four-year average of the annual number of licensed drivers in Iowa. During the first four years at 55 mph, both the fatality and fatal crash rate declined by over 40 percent. A comparison between the last four years at 75 MPH and last four years at 55 mph showed a 64.4 percent decrease in the fatal crash rate and a 56.4 percent drop in the fatality rate. Both rates calculated using VMT and licensed drivers showed significant decreases following the lowering of the interstate speed limit.

Table 7
Fatality Rates and Fatal Crash Rates per 100,000 Licensed Drivers
on Iowa's Rural Interstate Highway System
Speed Limit Change from 55 mph to 65 mph

	Four-Year Averages			
Time Period	Fatal Crash Rate	Percent Change	Fatality Rate	Percent Change
Last Four Years at 75 mph	2.02		2.48	
First Four Years at 55 mph	1.19	-41.1%	1.44	-41.9%
Last Four Years at 55 mph	0.72	-64.4%	0.88	-56.4%

Table 8 shows that during the first four years at the 65 mph speed limit, fatalities on Iowa's rural interstate system increased nearly 82.4 percent to an average of 31 fatalities, when compared to the last three years at the 55 mph speed limit.

Fatal crashes nearly doubled from an average of 14 in the last three years at the 55 mph speed limit to an average of 26 fatal crashes during the first four years at 65 mph.

The fatality average remained the same (31 fatalities) for the last four years and first four years at the 65 mph speed limit. The fatality average is 82.4 percent higher than the last four years at 55 mph.

Fatal crashes averaged just three fewer in the last four years of 65 mph speed limit than the first four years. (During the time of the 55 mph speed limit, average fatalities and fatal crashes were reduced by 39.1 percent).

Table 8
Fatalities and Fatal Crashes on Iowa's Rural Interstate System
Speed Limit Change from 55 mph to 65 mph

	Four-Year Averages			
Time Period	Fatal Crashes	Percent Change	Fatalities	Percent Change
Last Four Years of 55 mph	14		17	
First Four Years of 65 mph	26	85.7%	31	82.4%
Last Four Years of 65 mph	23	64.3%	31	82.4%

The near constant rise in the vehicle miles of travel dilutes the effect of the increase in fatalities and fatal crashes between the last years at the 55 mph speed limit and first years at 65 mph. Nevertheless, the nearly 37 percent increase in fatal crash rates and 34.8 percent increase in fatality rates points to a decrease in traffic safety associated with the increase in speed. (See Table 9.)

This phenomenon was mirrored after 1996 with the increase in expressway fatal crashes and fatalities following the increase in the speed limit on designated Iowa expressways from 55 mph to 65 mph.[3] With the increase in the estimated vehicle miles of travel, the crash rate and fatality rate appears to show a decline, even though the average number of annual fatalities has not changed between the first four years at 65 MPH and last four years at 65 MPH.

Table 9
Fatality Rates and Fatal Crash Rates per 100 Million Vehicle Miles of Travel
on Iowa's Rural Interstate System
Speed Limit Change from 55 mph to 65 mph

	Four-Year Averages			
Time Period	Fatal Crashes	Percent Change	Fatalities	Percent Change
Last Four Years of 55 mph	0.54		0.66	
First Four Years of 65 mph	0.74	37.0%	0.89	34.8%
Last Four Years of 65 mph	0.46	-14.8%	0.62	-6.1%

When fatality and fatal crash rates are calculated using the average number of licensed drivers, the percentage change increased for both the first four years and last four years at 65 mph, when compared to the last four years at the 55 mph interstate speed limit. Calculating the fatality and fatal crash rate shows an increase more in line with the average increase in actual fatalities and fatal crashes when the speed limit was increased to 65 mph. (See Table 10.)

[3] Safety Management System Taskforce on Speed Limits, Update Report(s) on Speed Limits in Iowa, 1998-2002

Table 10
Fatality Rates and Fatal Crash Rates per 100,000 Licensed Drivers
on Iowa's Rural Interstate System
Speed Limit Change from 55 mph to 65 mph

	Four-Year Averages			
Time Period	Fatal Crashes	Percent Change	Fatalities	Percent Change
Last Four Years of 55 mph	0.72		0.88	
First Four Years of 65 mph	1.33	84.7%	1.59	70.4%
Last Four Years of 65 mph	1.09	51.4%	1.47	67.0%

A complete historical table of fatal crashes, fatalities and the four-year averages addressed above for 1970-2005 on Iowa's rural interstate highways was created. Because of the size of the table, it is split into two tables, one covering the years 1970-1987 (Table 11a) and another covering the years 1988-2005 (Table 11b).

Table 11a
Fatality and Fatal Crash Rates, and Multi-Year Averages
for Iowa's Interstate System
1970-1987

Year	Fatal Crashes	Traffic Fatalities	Three-Year Averages	
			Fatal Crashes	Traffic Fatalities
75 mph daytime---65 mph nighttime				
1970	38	57		
1971	25	31	Last Four-Year Average	Last Four-Year Average
1972	35	37		
1973	41	48	35	43
Jan. 1, 1974 - Speed limit decreased to 55 mph				
1974	23	24		
1975	29	40	First Four-Year Average	First Four-Year Average
1976	20	27		
1977	19	21	23	28
1978	27	28		
1979	19	20		
1980	22	30		
1981	28	35		
1982	15	22		
1983	17	21	55 mph speed limit	
1984	13	15	Last Four-Year Average	Last Four-Year Average
1985	13	18		
1986	13	14	14	17
May 12, 1987 - Increased rural interstate speed limit to 65 mph				
1987	21	23		

Table 11b
Fatality and Fatal Crash Rates and Multi-Year Averages
For Iowa's Interstate System
1988-2005

Year	Fatal Crashes	Traffic Fatalities	Three-Year Averages	
			Fatal Crashes	Traffic Fatalities
Complete years at 65 mph on rural interstates: 1988 through 2004				
1988	28	35		
1989	26	28	First Four-Year Average	First Four-Year Average
1990	23	27		
1991	25	32	26	31
1992	25	29		
1993	29	34		
1994	26	36		
1995	19	26		
1996	20	30		
1997	29	32		
1998	25	34		
1999	32	38		
2000	35	41		
2001	30	39	65 mph speed limit	
2002	22	25	Last Four-Year Average	Last Four-Year Average
2003	24	38		
2004	16	23	23	31
July 1, 2005 - Increased rural interstate speed limit to 70 mph				
2005	38	47		

The Iowa legislature passed an increase in Iowa's interstate speed limit during the 2005 legislative session. The speed limit increase went into effect July 1, 2005. Preliminary data for 2005 shows an increase in the number of total number of fatalities (450) in comparison to 2004 (388).

There was also an increase in the number of rural interstate fatalities for 2005 (47) in comparison to 2004 (35). For the period of time that the new speed limit was in effect (July 1, 2005, to Dec. 31, 2005) there were 20 fatal crashes and 24 fatalities compared to 10 fatal crashes and 12 fatalities during the same period in 2004.

The evidence in this study and the previous seven annual comparison studies indicates that raising the speed limit in Midwestern states in the United States has resulted in an increase in traffic fatalities in the years following that increase.

The DOT relied upon the Iowa FARS (Fatality Analysis Reporting System) as the data source for compiling portions of this study. FARS data from surrounding states, used in the "Update Report(s) on Speed Limits in Iowa" (1998-2002), was taken from data in the National Highway Traffic Safety Administration's Traffic Safety Facts annual reports (1992-2004) and Fatal Accident Reporting System annual reports (1988-1991).

Fatality and fatal crash rate data were calculated using Iowa's FARS data, vehicle miles of travel data and driver's license data from the databases of the Iowa Department of Transportation.

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